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input channel (*see* Equation 2 for the response of a transfer channel).

[0100] The output signal a'_k from pre-equalizer (or feedforward) section 1901 is input to adder 1902. Adder 1902 subtracts the signal a''_k from selector 1906 from the output signal a'_k from feedforward section 1901. The resulting signal $a'''_k = a'_k - a''_k$ is input to slicer 1903. Slicer 1903 outputs a symbol $\hat{a}_k$ that is closest to the input signal a'''_k. The feedback section 1905 (see also feedback section 811 of Figure 8) of decision feedback equalizer 1900 comprises delays 1904-1 through 1904-L. Selector 1906 receives each of L past symbols $\hat{a}_{k-1}$ through $\hat{a}_{k-L}$ and uses these symbols to access a lookup table. The lookup table holds values ξ_1 through ξ_Q. The output signal a''_k of selector 1906 then is that one of ξ_1 through ξ_Q that corresponds to the combination of inputs $\hat{a}_{k-1}$ through $\hat{a}_{k-L}$. The time required to look the results up in a look-up table is much less than the time required to perform the L multiplications and L additions required of the feedback section shown, for example, as feedback section 811 of Figure 8.

[0101] In some embodiments, selector 1906 receives the look-up values ξ_1 through ξ_Q as input signals. In some embodiments, the look-up values ξ_1 through ξ_Q are preset. The look-up values ξ_1 through ξ_Q can also be adaptively chosen to optimize performance of the receiver of which decision feedback equalizer 1900 is a part. In most embodiments, $Q = A^L$ where A is the size of the symbol alphabet.

[0102] As an example, in a system using the PAM-5 alphabet where L=2, and Q is 25 there are twenty-five (25) lookup values (i.e., Q=25). Because the intersymbol interference in the input signal to adder 1902 is the result of two (2) ISI symbols,